In many ancient burying mounds round stones have been found; these were evidently used in making pottery, the wooden paddles which were probably placed with them having decayed. There is no difference between the modern article and these ancient stones found in the graves associated with pottery and other domestic articles buried with the dead.—EDWARD PALMER.

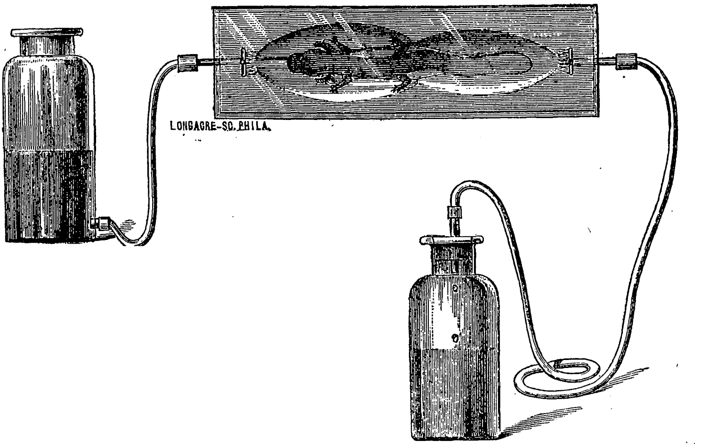
THE BERRIES OF RHAMNUS CROCEUS AS INDIAN FOOD.—This is a fine evergreen, producing numerous red berries which render it very showy. The Apaches collect and pound them up with whatever animal substances may be on hand, the berries imparting to the mixture a bright red color which is absorbed into the circulation and tinges the skin. On one occasion a detachment of the First Arizona Infantry Volunteers attacked a camp of Apaches in the Mogollon Mountains, northern Arizona, killed twenty-two and captured two children; the writer, being with the party as surgeon, examined the dead; their abdomens were much distended from eating greedily of these berries and other coarse substances; while their bodies exhibited a beautiful red net-work, the coloring matter having been taken up by the blood and diffused through the smaller veins. Among the captured stores were quantities of these berries dried, also much finely pounded meat and berries. A stone mortar, near by, plainly told the purpose for which it had been used; while numbers of rats and squirrels with the fur singed off, but otherwise entire, lay ready to form the next batch of mixed meat and berries. These Indians are not dainty, for they relish any part of an animal, even its viscera and blood.—EDWARD PALMER.

MICROSCOPY.

HOLMAN'S SIPHON SLIDE.—Mr. D. S. Holman of Philadelphia, whose life slide has recently become a really useful as well as a popular accessory to the microscope, has contrived a modification of that accessory to be known as the siphon slide, in which living objects of suitable size and habits can be retained under observation uninterruptedly for days or even weeks. A current of water or other fluid, of any required temperature, is made to flow continuously through the chamber containing the object, so that the processes of respiration, circulation, digestion, and nutrition, the phenomena of inflammation, and the effects of some classes of poisons may be studied at leisure and under perfectly natural or entirely controllable conditions. The habits of life of small

aquatic animals are similarly brought within reach of our observations. For the following cut and description of this valuable

Fig. 71.



"This invention presents a modification of the chamber of Mr. Holman's former device, known as the 'Life Slide.' It has fine perforations at each end of the chamber, too small to permit the escape of the animal under view, but sufficient to maintain a flow of water. These openings merge into cylindrical mouths, at each of which is attached a tightly-fitting elastic tube: one of these communicates with the reservoir of water, while the other acts as an escape conduit. The position of the slide, when in use, must be slightly *above* the level of the reservoir, while the escaping tube must rest *below* the reservoir; thus insuring a veritable siphon action in the apparatus, a constant flow of water being thus secured, in connection with the required atmospheric pressure for the retention of the cover of the slide. By this ingenious device, living aquatic animals may be retained in the chamber in a natural condition for hours, and even days."

contrivance we are indebted to the courtesy of the editor of the "Journal of the Franklin Institute."

STRUCTURE OF THE POTATO.—Mr. Thomas Taylor explains in a recent article that the vascular bundles in a potato may be easily seen by cutting a potato in two through its axis, the section also passing through some of its eyes, and coating the cut surface first with a solution of bichromate of potash and afterward several times with a strong tincture of iodine which will stain the starch blue but leave the vascular bundles yellow. The air-ducts will then be seen to extend invariably to the eyes.

For microscopical study thin sections are to be made and treated with a strong acid or caustic alkaline solution which will dissolve the starch but leave the vascular bundles unaltered. The sections may then be mounted as usual.

To isolate the vascular bundles place a potato, skinned without wounding the eyes, in a solution of sugar and water (two ounces

to the pint) and keep it at a temperature of 75° F. for nearly two weeks. The fungus of fermentation will reduce the potato to a pulp, except the vascular bundles which may be mounted in gum or balsam and studied with a power of one hundred diameters. They constitute a beautiful object, the pointed forms leading toward the eyes being distinctly seen.

He notices that different varieties of potatoes are affected in a widely different manner by the potato-rot fungus (*Peronospora infestans*), the Jackson White, for instance, being unaffected when the Early Rose growing in the same field were wholly destroyed by fungi. He believes it probable that, other things being equal, those varieties of potatoes which have the smallest air passages will be least affected by the fungus. The Santa Fé potatoes resisted fungoid and infusorial action far better than any other varieties tested, and it is claimed that they also, when growing in the field, resist the "rot" which destroys the varieties commonly cultivated in this country.

MICROSCOPIC DRAWING. — Wishing to make a neutral tint reflector, and while planning a frame in which to mount it, it occurred to me that a reflector to take the place of the steel disk of Soemmering might be made by mounting a piece of looking-glass in the same way as a neutral tint reflector, but with the silvering removed except a small disk less than the size of the pupil. On trial I found the reflection good, but the thickness of the glass looked through in such an oblique position tinted the field. In order to avoid this I made a mirror with a small disk of tin-foil wet with mercury and placed on the centre of a thin glass cover. This I mounted as before, and found it to work perfectly. This little contrivance which can be made by any one of ordinary mechanical ability will take the place perfectly of the expensive camera lucida.

I made another, using wood in place of brass. I centred a piece of wood and turned a place for the cap end of the ocular and a smaller hole the rest of the distance through the bit of wood; turned the outside in the form of a cylinder and sawed off the end in a mitre-box to an angle of forty-five degrees; then bored a one-half inch hole near the end of the tube for the reflected rays, and turned a disk with a cell for the mirror and fitted the thin glass, keeping it in with a small ring of wood glued over

the edge of the glass. The microscope being arranged for drawing and an object focussed, this tube was adjusted and the oblique end smeared with glue; then the disk was fitted to the end of the tube in such a manner that the bit of mirror was in its optical axis. After the glue was dry the projecting edge of the disk was removed and the eye end of the apparatus cut down so that the eye might approach the reflecting surface. This works nicely, and is much more easily made than the brass mounting.—F. B. KIMBALL, M.D.

AIR-CELLS IN A FLOATING LEAF.—In the leaf of *Limnanthemum lacunosum*, or floating-heart, may be demonstrated multitudes of peculiar stellate bodies, apparently like those found in the stem of *Nuphar*. The whole interior of the leaf is studded with them. There are no ordinary large air-spaces so often found in other floating leaves, but all through the parenchyma these curious bodies are irregularly scattered.

They vary in size and also in the number of rays given off by each. These rays are smooth and not echinulate like those in *Nuphar*. In the field of a $\frac{2}{3}$ lens I have counted hundreds at one view. Under the polarizing binocular microscope properly illuminated, they are revealed with startling distinctness and beauty.

It is nearest the under epidermis that they are located, and the best view therefore is obtained from beneath. Their true physiological significance is not doubtful. In the natural condition they contain air, and the floating-heart rides securely on the surface of the lake, buoyed up by innumerable life-preservers which are not likely to shift out of place.

The veins in the leaf are present, of course, but are comparatively rudimentary. The vascular bundles are faintly marked, and only a few delicate supporting cells line their margins; thus giving another example of nature's economy, for where strongly developed organs are not necessary there we do not find them. — J. G. HUNT, M.D.

LIFE OF HÆMATOZOA. — Francis H. Welch describes in the "Monthly Microscopical Journal" a thread-worm (*Filaria immitis*), infesting the vascular system of the dog, and thus theorizes as to the method by which such parasites, which are now doubly interesting from having been recently discovered in human blood, may effect an entrance into the system. "The faculty of

migration of the white corpuscles of the blood through the tissues of the body has been demonstrated; the diameter of the body of the young filaria is considerably below that of the corpuscle; hence with the brisk, wriggling movements of life, the possibility of their passage through a mucous membrane, especially through the soft granulations of an ulcer, is quite within the bounds of reality. Based upon the facts we know, we may in imagination follow them from a mucous tract (*e. g.* the intestine) to a lacteal or blood vessel; they follow the course of the circulation, growing on the pabulum of the blood of the host, and easily passing with the corpuscles through the capillaries; soon their size unfits them to traverse every viscus, and the minute capillaries of the lungs act as a sieve to retain them in the venous circulation; they copulate and the females become fecund; a young brood arises to continue the race, provided accidental causes, such as mechanical blocking up of important blood-vessels by the parent worm, do not determine the death of the host. By this hypothesis the ingress of individuals capable of arriving at maturity is explained, while the countless hordes of young are rendered lucid only by the presence of one or more parent worms within the vascular walls. These parent worms after producing their progeny may possibly die and disintegrate, and so account for their absence, or non-discovery, in hosts teeming with the young brood." The presence of the parent worm is attributed suggestively to the ingestion of water or under-cooked flesh containing them.

FINDING THE CHEMICAL FOCUS IN PHOTOMICROGRAPHY.—Prof. H. A. Rowland has suggested, at the Troy Scientific Association, the simple expedient of laying a broad flat object, as for instance a microphotograph or a large transparent section, obliquely upon the stage, so that one edge shall be considerably higher than the other. The objective is then carefully focussed for some one well-marked portion of the object, and a photograph taken which will of course show the best definition at some other portion. The instrument is next focussed for the point in the object which in the photograph is best defined, and the distance apart of these two planes, measured by the fine adjustment wheel, being the distance of the chemical from the visual focus, is a correction which may always be employed in photographing with the same objective, the lens being focussed as usual by sight and then turned out of focus

the required distance. This method is applicable to the lower powers, and is for them far preferable to the usual procedure of guessing at the amount of correction required and taking a series of photographs to determine which is the most successful correction.

A SPHERICAL DIAPHRAGM.—Wishing to use tubular diaphragms with my microscope, and knowing how clumsy the ordinary ones are, I set to work, and endeavored to devise a substitute. I made a globe one and one-fourth inches in diameter and drilled holes through it of the proper grade of sizes, and adjusted it so that by a spring stop the holes will correspond to the axis of the microscope when the ball is revolved on its axis by a milled head at the right of the stage. The fittings are so arranged that the diaphragm may approach or recede from the stage so as to touch the slide or be far from it. The globe may be made hollow and the lower part cut off if the tubular wells are not desired. I think this form of diaphragm offers many advantages over the ordinary piece of apparatus.—F. B. KIMBALL.

LEAF SECTIONS.—Mr. Charles Stewart obtains sections of fresh leaves by inserting a piece of the leaf in a notch cut in a carrot and cutting slices through both carrot and leaf. The sections are then soaked in water in a watch-glass under an exhausted receiver, stained with hæmatoxylin, and transferred through water, absolute alcohol and oil of cloves to the mounting medium. In the oil of cloves they would curl up were they not prevented by a heavy cover glass laid upon them.

ANOTHER ERECTOR.—John A. Perry, of Liverpool, recommends an objective, inverted, above the eye-piece as an erector. With a 1 inch working objective and A ocular, a $\frac{1}{2}$ or $\frac{1}{4}$ objective may be inverted and stood upon the cap of the ocular, giving an increase of power and of working distance as well as an erect image. [A $\frac{1}{2}$ objective supported on an adapter two inches long seems to perform as well as any; but the inconveniences of the method seem to be too great for its advantages.]

CEMENTS.—Mr. F. Kitton prefers, for making varnish cells, asphalte with the addition of a small quantity of gold size; the cells when finished being dried over night in a cool oven. For mixing colors with, he prefers dammar cement with a few drops of

gold size; the exterior ring being of vermilion or purple lake, and the interior ring white zinc in preference to white lead. Sealing wax varnish he does not trust.

AUTO-MICROSCOPY.—Dr. Otto Obermier, who died of cholera at Berlin a few months since at the age of thirty-one, deserves to be remembered as the first microscopist, probably, who continued his studies in pathology by the study of his own blood during the progress of the disease of which he died; the disease having been contracted, also, by imprudent devotion to its investigation.

MEASURING THE GROWTH-RATE OF PLANTS.—E. Askenasy measures with a micrometer the advance of the growing point of a root or branch in a glass tube in the field of the microscope. The stem is fixed by cork or other means at one end of the tube, and the conditions of light, temperature and moisture are easily regulated.

A REVOLVING AMPLIFIER.—Mr. John Emery exhibited, at the Royal Microscopical Society, a series of amplifiers, plano-concave lenses of different foci, arranged in a metallic disk which revolves so as to bring any desired lens within the body of the microscope.

QUIETING FROGS.—At the Medical Microscopical Society, Dr. Bruce stated that a frog might be quieted, for experiment on the circulation, etc., by holding for a few minutes in the hand, as well as by the usual plan of immersing in warm water.

NOTES.

LT. G. W. WHEELER'S Expedition, for the Survey of the Territories west of the 100th meridian, has lately returned to Washington to elaborate the results of the last season's work in the field. A very extensive ground in Colorado, Utah, New Mexico and Arizona was thoroughly gone over, and large collections were made by the naturalists of the expedition in all departments of zoology, as well as in botany and geology. The suite of birds is particularly large and valuable, embracing many rarities and desiderata. Too much credit cannot be given to Mr. H. W. Henshaw for his indefatigable exertions in this department. His skins are in admirable preservation, and form one of the most valuable lots ever brought from the West. The birds and mammals will be elaborated by Mr. Henshaw, in connection with Dr. H. C. Yarrow, a